on government networks. In very broad terms, the objective is to provide better situational awareness for those on the frontlines of the cyber-battlefield and to act as a central hub for interagency information-sharing, unifying the alphabet soup of government agencies in warding off attacks.

Heading the NCSC is Rod Beckstrom, a former Silicon Valley entrepreneur who co-founded TWiki.net, which sells open-source collaboration software to businesses. Beckstrom, who co-authored the best-selling management book *The Starfish and the Spider*, is an unlikely fit with Washington's bureaucracy. His book proposes a decentralized management model—perhaps just what the federal government's innumerable agencies, bureaus and departments need.

Cyber-attacks worldwide are escalating at an alarming rate.

André M. DiMino, the co-founder and director of the Shadowserver Foundation, a nonprofit group of volunteer security professionals who identified the server at the heart of the Georgia attacks, calls the new agency "a step in the right direction." He says the government should initiate a standard way to handle attacks and respond faster to increasingly sophisticated hacker tools. As an example, he points to the use of a recently developed technique called Fast Flux in which hijacked computers, called zombies, set up a shell game of constantly changing fake IP addresses. Using this method, an attack can come from one source and then another just a few minutes later, making them hard to block and trace.

While Beckstrom and his team are forging a unified front against cyber-terrorism, other arms of the CNCI will work toward reducing the number of federal Internet portals from an estimated 4,000 to fewer than 100, expanding a cyber-emergency-readiness team, creating a secure operating system for government computers, and developing a computer-monitoring system designed to look for security lapses.

DiMino applauds such efforts but hopes for more. "There's always room for improvement," he says.

—HENRY SCHLESINGER

FUTURE MEDICINE

WRIGGLING AWAY FROM CANCER

Tiny strings of drug-laden iron particles could kill tumors

"CANCER TREATMENTS have hit a wall," says chemist Michael J. Sailor of the University of California at San Diego. Today's chemotherapy drugs leave the body too quickly, and both chemo and radiation kill healthy cells indiscriminately, he explains. So he has developed "nanoworms," strings of iron-oxide particles that could swim through your blood to kill nascent cancerous tumors—and nothing else.

This past spring, Sailor published his preliminary results from rodent studies showing that the worms can congregate in tumors, a critical first step to delivering medication directly to cancerous cells. One key to the worms' success is their shape. The liver or other immune cells swallow up single nanoparticles in minutes, well before they can accumulate in a tumor. But previous studies have shown that longer molecules, like the worms and viruses, can evade these defense mechanisms for up to 24 hours. This gives the worms, which can be loaded with chemotherapy drugs and coated with molecules that bind only to cancerous cells, enough time to circulate throughout the body and hunt tumors. Once the worms latch onto a tumor, they would release their payload. Meanwhile, the body would naturally excrete any unbound iron oxide.

The first use in humans, Sailor says, could be for tumor detection. It turns out that worm-covered tumors show up more vividly on MRI scans, making it possible to catch tumors at an earlier stage. Sailor plans to recruit patients and begin clinical trials by 2010. Below, a look at how drug-filled worms could wipe cancer from your body.—ARNIE COOPER

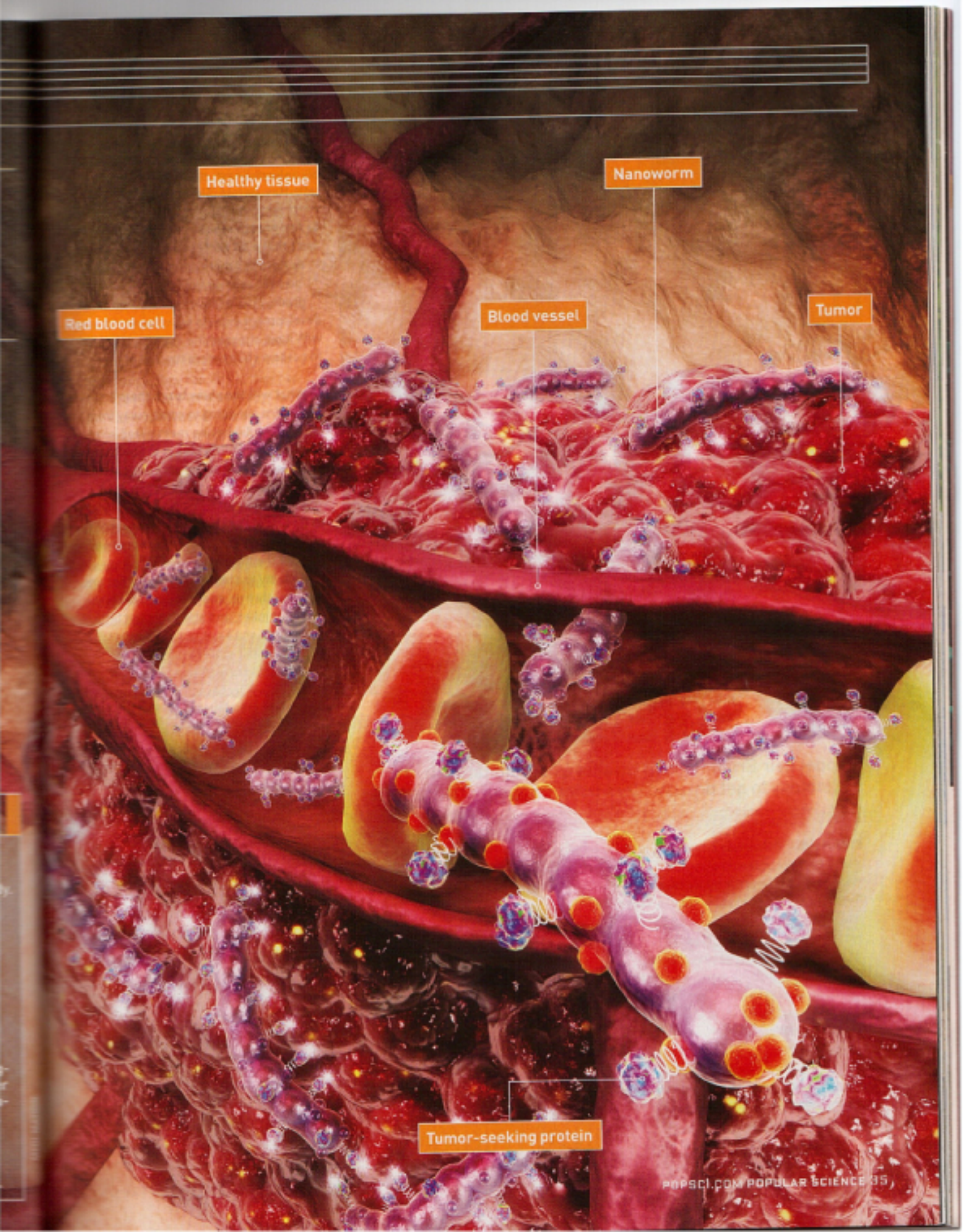
A VIEW TO A KILL

STEP 1 Doctors inject train-like nanoworms into a vein, and the worms circulate through the body.

STEP 2 Coated with tumor-specific proteins, the worms home in on the cancer. Their elongated shape allows the proteins to latch onto the tumor at multiple points.

STEP 3 Doctors perform an MRI on the patient. The iron-oxide worms react strongly to the magnetic scanner, producing brighter images of young tumors than traditional scanning techniques do.

STEP 4 The medication can be released using enzymes, heat or a time-release mechanism.


Healthy tissue
Nanoworm
Red blood cell
Blood vessel
Tumor
Tumor-seeking protein